REMARKS/ARGUMENTS

Claims 1 – 2, 13 – 22, 25 and 26 stand rejected under 35 USC 102(b) as anticipated by Ward et al. (United States Patent Serial No. 4,736,390) (hereinafter Ward). Claims 3-9 stand rejected under 35 USC 103(a) as being unpatentable over Ward in view of Sevenhans et al. (U.S. Patent No. 5,422,889) (hereinafter Sevenhans). Claims 10-12 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 1-2, 15-16 and 21 are amended to clarify their respective languages and to further define their respective inventions. For example, claim 1 now recites, in part, "A radio frequency (RF) down-convertor with reduced local oscillator leakage, for emulating the demodulation of an input signal *x(t)* with a local oscillator signal having frequency *f*, said down-convertor comprising.....neither φ1 nor φ2 has significant power at the frequency f of said local oscillator signal being emulated; and said mixing signals φ1 and φ2 are designed to emulate said local oscillator signal having frequency f, in a time domain analysis..." In view of the foregoing amendments and following remarks, reconsideration of the rejections of the pending claims is respectfully requested. Applicants submit that the claims presently on file distinguish over these references, but note that the claims have been amended to clarify their respective languages and to expedite the issuance of the patent.

Ward describes a down-conversion topology which combines pseudo-random encoding with a standard zero-IF topology. Ward explains at lines 8 – 12 of column 1: "Zero IF type receivers are well known in the prior art and essentially a zero IF type receiver skips the step of going to an IF frequency and instead converts the desired incoming signal directly to baseband in a single operation." In other words, a zero-IF topology uses a single mixer, and down-converts the incoming signal to baseband (for example) with a single mixing signal at the carrier frequency of the received signal.

Ward modifies this system by spreading the single mixing signal with a pseudo-random signal, and then at a second mixer, de-spreading the output from the first mixer using the same pseudo-random signal. But a single mixing signal is being used to perform the down-

conversion. The pseudo-random signal is being used for a different purpose – spreading and de-spreading rather than down-conversion.

Claim 1 distinguishes from the system of Ward for at least the following reasons. Ward fails to describe a complementary pair of mixing signals which emulate a direct-conversion mixing signal, but rather, uses a direct-conversion topology and a single mixing signal, and have laid known spreading and de-spreading over it. As best understood, because in Ward the spreading and de-spreading are done with identical signals, any leakage from the local oscillator to the input of the first mixer would simply be spread and then de-spread again by the second mixer. Hence, the Ward system fails to reduce the effect of LO leakage at the input to the first mixer.

Furthermore, it appears that the Ward system would reduce the effect of LO leakage at the input to the second mixer, because any leakage at this point would be spread at the output of the second mixer. However, the second mixer only exists because the Ward system has added the second mixer to the zero-IF topology. Consequently, the Ward system does nothing to reduce LO leakage at the first mixer, and adds a second mixer that apparently does not have a major LO leakage problem. The second mixer adds to the size of the circuit, consumes power, and adds noise to the input signal. Therefore, it is not clear how the addition of this second mixer and the pseudo noise signals in Ward would do anything to improve overall performance.

Moreover, the mixing signals provided by the Ward system do not emulate a direct-conversion local oscillator signal "in a time domain analysis", as recited, in part, in claim 1. As noted in the Abstract, Figure 3b, and the corresponding description of the original disclosure, the mixing signals $\varphi 1$ and $\varphi 2$ of the invention are designed to emulate a direct-conversion local oscillator signal, in a time domain analysis, at any given point in time. The mixing signals $\varphi 1$ and $\varphi 2$ can take on any irregular pattern, provided that a time domain analysis shows them to emulate a direct conversion signal - one simply has to consider any vertical line in the time vs. amplitude diagram of Figure 3b to see that the two mixing signals emulate a regular square wave direct conversion local oscillator signal. There is no disclosure in Ward of any mixing signal "designed to emulate said local oscillator signal having frequency *f*, in a time

domain analysis". Claim 1 is thus allowable over Ward. Claims 2-22, and 25-26 are allowable for at least the same reasons as claim 1.

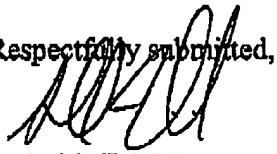
Claim 2 is further allowable for reciting additional limitations that Ward fails to teach or suggest. Claim 2 further recites, in part, "generating mixing signal $\varphi 1$ and $\varphi 2$, such the product $\varphi 1 * \varphi 1 * \varphi 2$ will not result in a significant amount of power within the bandwidth of the input signal...." Ward does not describe the generation of such mixing signals, and the HPF does nothing to change the mixing signals themselves – it merely changes the converted signal being passed from the first mixer to the second. Thus, Ward fails to teach claim 2 for this additional reason.

Claims 3-9 stand rejected under 35 USC 103(a) as being unpatentable over Ward in view of Sevenhans. Sevenhans fails to describe a mixing topology as recited in the above claims. Furthermore, there is no suggestion that the offset correction circuit of Sevenhans will work with the topology and signals of the Ward. Moreover, as described in the Abstract, the offset correction circuit of Sevenhans is intended to be used with "TDMA structure on a carrier with a carrier frequency FC which changes from time slot to time slot". This is reiterated at lines 5 – 7 of column 1 of Sevenhans, and elsewhere in the Sevenhans patent. In other words, Sevenhans is directed at other objectives. In addition, claim 6 recites that the closed loop correction circuit is for "modifying a parameter of one of said mixing signals", which Sevenhans fails to teach or disclose. Claim 7 further distinguishes from the Sevenhans by reciting "said error level measurement comprises a power measurement". There is no reference in Sevenhans of a power error measurement being used to tailor mixing signals.

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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